Lewis Antigens on Newborn Red Cells

SIRIPAN KIJKORNPAN, B.Sc.*,
CHALERMCHAI SUEBSAENG, B.Sc.*,
PIMOL CHIEWSILP, M.D.**

Abstract

This study aimed to screen for Lewis antigens in Thai newborns. Although, these antigens are known to be weak or absent on the red cells of newborns, we encountered a case of a Le(a+) newborn baby when testing with monoclonal antibody and human anti-Le^a. Such a finding led us to conduct this study to explore further evidence of Lewis antigens in Thai newborn red cells. A total of 197 cord blood samples were tested with monoclonal anti-Le^a and anti-Le^b (Bioclone, Ortho Diagnostic Systems, USA). The tests were performed according to the manufacturer's recommendations. The results revealed that none of the cord red cells in this study group possessed Lewis antigens. This study showed that Lewis antigens were absent or were so extremely weak on the red cells of these newborn infants that they could not be demonstrated despite the use of potent monoclonal antibodies. However, further study should be done by using more cord blood samples, a more sensitive technique or even more potent antisera.

Key word : Lewis Antigens, Cord Red Cells

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The Lewis antibodies are the most common unexpected red cell antibodies found among Thai populations(1). Lewis antibodies have been identified in the maternal blood by routine hemagglutination technique. Lewis antibodies are almost always IgM and Lewis antigens are poorly developed at birth, they have not been implicated in hemolytic disease of the newborn(2). The absence

* Department of Pathology, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Bangkok 10400,
** National Blood Centre, Thai Red Cross Society, Bangkok 10330, Thailand.

or low level of Lewis antigens on fetal red cells may attribute to this observation. However, we encountered a case of a Le(a+) newborn baby when testing with monoclonal and human anti-Le^a[3].

Objective of this study was to explore further evidence of Lewis antigens in Thai newborns.

MATERIAL AND METHOD

Blood Samples

In September 1995 a total of 197 cord blood samples from babies born at Ramathibodi Hospital and Rajavithi Hospital were collected by free drainage of each sample into a dry test tube without anticoagulant.

Tests were performed within 2 days after collection. Monoclonal (BioClone, Ortho Diagnostic System , USA) anti-Le^a and anti-Le^b were used for Lewis antigen typings.

Method

Lewis antigen typings were performed according to the manufacturer's instructions with modification from tube test to U-well microplate technique as follows:

1. A 2 per cent saline suspension of well washed red blood cells was prepared.
2. Thirty µl of anti-Le^a or anti-Le^b was added into each well.
3. Using a Pasteur pipette, one drop of the test red cell suspension into each test well was added.
4. Mixed gently and incubated at room temperature (22°C) for 5-10 minutes
5. After incubation, centrifuged at 1000 rpm for 1 minute.
6. The cells were resuspended and examined macro-scopically for agglutination.
7. The known positive and negative cell controls were added to each run of the tests. The results of the tests were valid when the positive and negative cell controls yielded the corresponding results.

RESULTS

All of the 197 cord blood cells gave negative reactions with monoclonal anti-Le^a and anti-Le^b while the positive control cells gave approximately 3+ reactions.

DISCUSSION

The frequency of Le (a-b-) phenotype is considerably high among Mongoloid ethnic groups. The variation was from 8-20 per cent[4,5] Approximately, 80-90 per cent of these newborn infants will be eventually converted into Le(a+b-) or Le (a-b+) according to their genetic make-up. Although we encountered a case of a Le(a+b-) newborn baby, none of the 197 cord blood samples yielded a positive reaction when tested against monoclonal anti-Le^a and anti-Le^b antibodies. In contrast, a study in Taiwan of 120 cord blood samples using mouse monoclonal antibodies to human Lewis blood group antigens showed 50 per cent of them were Le(a-b+) and 50 per cent were Le(a-b-)[4] In addition to this finding, Cutbush, Giblett and Mollison found that 13 out of 22 samples of cord blood gave a positive antiglobulin reaction with their anti-Le^a serum [6]. This finding may indicate the absence or extremely low level of Lewis antigens on these cord blood samples.

SUMMARY

The result revealed that no Lewis antigens were detected by monoclonal Lewis antibodies among this study of cord blood samples. However, further study should be done using more samples of cord blood and a more sensitive technique or even with more potent antisera. This study shows the absence, or such a low level of Lewis antigens that can not be detected, by these monoclonal Lewis antibodies at birth among this study group.

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Lewis antigens บนเม็ดเลือดแดงของทารกแรกคลอด

สิริพรรณ กิจกรพันธ์, วท.บ.,*
เฉลิมชัย สืบแสง, วท.บ., พิมล เชี่ยวศิลป์, พ.บ.***

การศึกษานี้มีวัตถุประสงค์จะตรวจ Lewis antigen ในทารกไทยแรกคลอด แม้ว่าเป็นที่ทราบกันว่าแอนติเจนของระบบนี้มีอยู่น้อยหรือตรวจไม่พบบนเม็ดเลือดแดงของทารกแรกคลอด คณะผู้วิจัยเคยพบผู้ป่วยเด็กไทยแรกคลอดมี Le(a+) เมื่อทดสอบกับ monoclonal antibody และ human anti-Le^a จึงได้ทำการศึกษาเพื่อตรวจหา Lewis antigens ในเด็กไทยแรกคลอดจำนวนมากขึ้น โดยได้ตรวจในเลือดสายสะดือ (cord blood) 197 ราย ด้วย monoclonal anti-Le^a และ anti-Le^b ใช้วิธีตรวจที่แนะนำโดยบริษัทผู้ผลิต (Bioclone, Ortho Diagnostic Systems, USA) ผลที่ได้คือ ตรวจไม่พบทั้ง Le^a และ Le^b antigens ในเลือดสายสะดือทั้งหมดที่ทดสอบ การศึกษานี้แสดงว่าไม่มี Lewis antigens บนเม็ดเลือดแดงของเด็กไทยแรกคลอดกลุ่มนี้ หรือถ้ามีก็ต้องอ่อนมากจนกระทั่งไม่สามารถตรวจพบได้ แม้ว่าใช้ monoclonal antibodies ที่มีความแรงแล้วก็ตามควรได้มีการศึกษาเพิ่มเติมต่อไป ด้วยการเพิ่มจำนวนตัวอย่างเลือดสายสะดือและใช้วิธีที่ไวขึ้นหรือเลือกใช้ antisera ที่มีความแรงยิ่งขึ้น

คำสำคัญ : ลิวอีสแอนติเจน, เม็ดเลือดแดงในสายสะดือเด็ก

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* ภาควิชาพยาธิวิทยา, คณะแพทยศาสตร์ โรงพยาบาลรามาธิบดี, มหาวิทยาลัยมหิดล, กรุงเทพ ฯ 10400
** ศูนย์บริการโลหิตแห่งชาติ, สภากาชาดไทย, กรุงเทพ ฯ 10330